

DETAILED ACTION

Applicants' amendment/remarks filed on 3/12/2010 is acknowledged.

Claims 6, 8, 10, and 13 are being considered on the merits.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 6, 8, 10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta et al. (US 4,478,866; hereinafter R1) in view of Petersen et al. (2000, A rapid phospholipase D assay using zirconium precipitation of anionic substrate phospholipids; application to N-acyl ethanolamine formation in vitro; hereinafter R2).
3. R1 discloses that lysophosphatidic acid and its salts possess advantageous properties as emulsifiers for use in foodstuffs and in particular for making dough and for use in the production of farinaceous products. (Abstract).
4. R1 discloses the hydrolysis products of phosphatidyl choline, phosphatidyl ethanolamine, and other phospholipids of commercial lecithin. (col. 4, lines 1-50) Table 2 (col. 3) discloses that one of the components of commercial lecithin is phosphatidyl ethanolamine (PE)

5. R1 discloses the effect of lysophosphatidic acid (LPA) on the quality of bread. (col. 7, lines 3-50).
6. R1 also discloses that the reaction of phospholipase A and Phospholipase D will produce the lysophosphatidic acid with emulsifying properties.
7. It is noted that N-acyl phosphatidyl ethanolamine in which the free amino group of phosphatidyl ethanolamine is acylated by a further fatty acid is a common constituent of cereal grains e. g. wheat, barley oats. Therefore, it is obvious, according to R1, that in order to convert this compound, in the dough, to the lysophosphatidyl derivative, a phospholipase with specificity toward N-acyl phosphatidyl ethanolamine should be selected.
8. The action of phospholipase A on N-acyl phosphatidyl ethanolamine produces the N-acyl lysophosphatidyl ethanolamine. However it is obvious that when the substrate is N-acyl lysophosphatidyl ethanolamine (either sn1 or sn2 positions of the phospholipid is esterified to a fatty acid), as presently claimed, the only enzyme needed would obviously be phospholipase D to convert the lysophosphatidyl ethanolamine to lysophosphatidic acid of high emulsifying capacity as disclosed by R1.
9. R2 discloses an assay method for the detection of N-acylphosphatidyl ethanolamine (NAPE) specific phospholipase D. (Abstract).
10. R2 discloses that the action of this specific phospholipase D on NAPE is the formation of phosphatidic acid (PA). (page 1533, Fig. 1). Other techniques, such as thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC) as presently claimed, for the detection of hydrolysis products are also known in the art.

11. It is noted that a N-acyl phosphatidyl ethanolamine specific lipolytic enzyme is being assayed and selected as presently claimed. It is also noted that N-acyl phosphatidyl ethanolamine is a natural constituent of wheat flour. Therefore, it is obvious to assay and select a N-acyl phosphatidyl ethanolamine specific lipolytic enzyme and incorporate it into wheat flour to cause the hydrolysis of the naturally occurring NAPE and the concomitant formation of lysophosphatidyl ethanolamine and finally convert it to lysophosphatidic acid which will function as a valuable emulsifier in the dough.

12. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use phospholipase A and phospholipase D for baking as taught by R1 and assay and select a NAPE specific phospholipase A or phospholipase D as taught by R2. One would do so to cause a selective hydrolysis of natural N-acyl phosphatidyl ethanolamine in wheat flour and take advantage of the emulsifying properties of the resulting lysophosphatidic acid. Absent any evidence to contrary and based on the combined teachings of the cited references, there would be a reasonable expectation of success in assaying and selecting a NAPE specific phospholipase D to be used in baking bread.

Response to Arguments

Applicants' arguments have been reviewed thoroughly. These arguments are not persuasive for the following reasons.

1. Applicants argue that R2 discloses the reaction of N-acyl phosphatidyl ethanolamine with phospholipase D producing phosphatidic acid.

a. The primary reference (R1) discloses the action of phospholipase A, together with phospholipase D on the formation of lysophosphatidic acid (emulsifier). Therefore, the importance and the effect, on the dough quality, of using phospholipase A and phospholipase D is disclosed by R1. The present claim 1, requires detection of the hydrolysis of an ester bond in N-acyl phosphatidyl ethanolamine. The hydrolysis of ester bonds in either sn1 position or sn2 position of the phospholipid will produce fatty acids whose detection is conventionally done using chromatographic methods. Claim 1 does not specify which ester bond(s) (organic or inorganic) is/are required to be broken in the phospholipid. Furthermore, in claim 1 an ester bond hydrolysis is required in parts b and d and while the hydrolysis of ester bonds (plural) is required in part e. As written, claim 1 is not clear. However, R1 and R2 disclose the hydrolysis of ester bonds therefore the meet the requirements of claim1 and the dependent claims.

R2 teaches of detecting the action of phospholipase D which is specific for N-acyl phosphatidyl ethanolamine.

Therefore, selectively hydrolyzing N-acyl phosphatidyl ethanolamine or N-acyl lysophosphatidyl ethanolamine would have been obvious over R1 in view of R2.

2. Applicants argue that R2 is silent as to baking additives.

a. The role of lysophosphatidic acid as an emulsifier in doughs and baking is disclosed in detail by R1, R2 does not have to disclose the same concept.

3. Applicants argue that nowhere does R1 teach or suggest the screening methods of Applicants' claims and in particular nowhere does R1 teach or suggest the selection of a lipolytic enzyme which has a higher hydrolytic activity on ester bonds in the APE or ALPE than the ester bonds in PC.

a. The presently claimed invention is obvious in light of teachings of R1 and R2. Claim 1 as written requires hydrolysis of an ester bond in either phosphatidyl ethanolamine or phosphatidyl choline. Claim 1 does not specify which ester bond(s) is (are) broken. Since R1 and R2 disclose the hydrolysis of ester bonds and further R2 teaches of a phospholipase D specific for phosphatidyl ethanolamine, it would be obvious to screen for such enzymes. Col. 4 of R1 shows the release of a fatty acid. Therefore, the phospholipase is hydrolyzing an ester bond

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HAMID R. BADR whose telephone number is (571)270-3455. The examiner can normally be reached on M-F, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571) 272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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